

SC090N75ZTK-R

Silicon Carbide MOSFET 750V, 90mΩ, 36A



重庆平伟半导体股份有限公司

Features

- 0 V turn-off gate voltage can be applied
- High Blocking Voltage with Low RDS(on)
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Qualified according to JEDEC criteria



100% DVDS Tested
100% Avalanche Tested

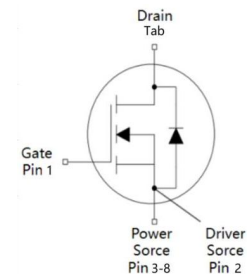
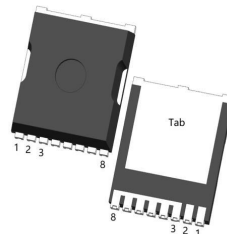
Applications

- Lighting
- Telecom and UPS
- PWM stages for e.g. PC Silverbox, Adapter, LCD & PDP TV

Product Summary

V_{DS}	750V
$R_{DS(on)}$ typ.	90mΩ
I_D	36A

TOLL-02



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
SC090N75ZTK-R	SC090N75ZTK	TOLL-02	Tube	N/A	N/A	50pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	750	V
Continuous drain current $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$ (Silicon limit)	I_D	36 25	A
Pulsed drain current ($T_C = 25^\circ\text{C}$)	$I_{D \text{ pulse}}$	107	A
Avalanche energy, single pulse ($L=5\text{mH}$)	E_{AS}	63	mJ
Gate-Source voltage,max.transient voltage	V_{GSmax}	-10/+22	V
Gate-Source voltage,max.static voltage	V_{GSsop}	0/+18	V
Power dissipation $T_C = 25^\circ\text{C}$	P_{tot}	111	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+175	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	R_{thJC}	-	0.9	1.4	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	R_{thJA}	-	-	40	°C/W	

Electrical Characteristic (at $T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	750	-	-	V	$V_{GS}=0V, I_D=500\mu A$
Gate threshold voltage	$V_{GS(th)}$	2.7	3.6	4.5	V	$V_{DS}=V_{GS}, I_D=7.5mA$
Zero gate voltage drain current	I_{DSS}	-	1	10	μA	$V_{DS}=750V, V_{GS}=0V$ $T_j=25^{\circ}C$ $T_j=175^{\circ}C$
Gate-source leakage current	I_{GSS}	-	-	100	nA	$V_{GS}=22V, V_{DS}=0V$
		-	-	-100	nA	$V_{GS}=-10V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	90	120	mΩ	$V_{GS}=15V, I_D=17A$
Drain-source on-state resistance	$R_{DS(on)}$	-	68	-	mΩ	$V_{GS}=18V, I_D=17A$
Transconductance	g_{fs}	-	15	-	S	$V_{DS}=20V, I_D=17A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	1069	-	pF	$V_{GS}=0V, V_{DS}=400V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	82	-		
Reverse Transfer Capacitance	C_{rss}	-	4	-		
Gate Total Charge	Q_G	-	30	-	nC	$V_{DS}=400V, I_D=17A$ $, V_{GS}=0V/15V$
Gate-Source charge	Q_{gs}	-	10	-		
Gate-Drain charge	Q_{gd}	-	13	-		
Turn-on delay time	$t_{d(on)}$	-	12	-	ns	$V_{GS}=0/18V, V_{DD}=400V,$ $R_G=5.1\Omega, I_D=16A$
Rise time	t_r	-	32	-		
Turn-off delay time	$t_{d(off)}$	-	12	-		
Fall time	t_f	-	13	-		
Gate resistance	R_G	-	1.0	-	Ω	$V_{GS}=0V, f=1MHz$

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Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	3.3	-	V	$V_{GS}=0V, I_{SD}=8.5A$ $T_j=25^{\circ}C$
		-	2.8	-		$T_j=175^{\circ}C$
Body Diode Continuous Forward Current	I_S	-	-	36	A	$T_C = 25^{\circ}C$
		-	-	30	A	$T_C = 100^{\circ}C$
Body Diode Reverse Recovery Time	t_{rr}	-	52	-	ns	$V_{GS}=-5V, I_{SD}=17A,$ $V_R=400V$ $di/dt=1000A/us$
Body Diode Reverse Recovery Charge	Q_{rr}	-	110	-	nC	
Peak Reverse Recovery Current	I_{RRM}	-	4.2	-	A	

Typical Performance Characteristics

Fig 1: Output Characteristics $T_j=25^{\circ}\text{C}$

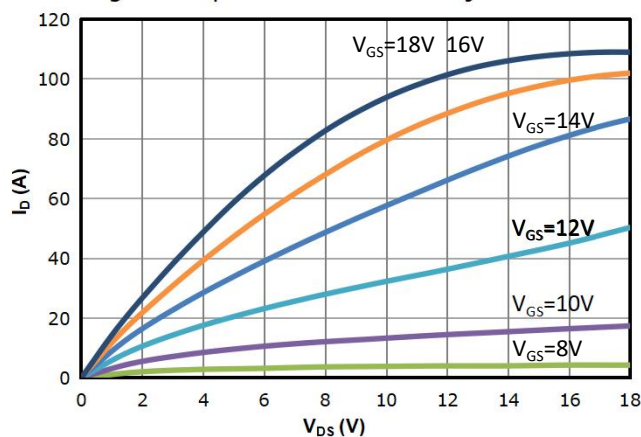


Fig 2: Output Characteristics $T_j=175^{\circ}\text{C}$

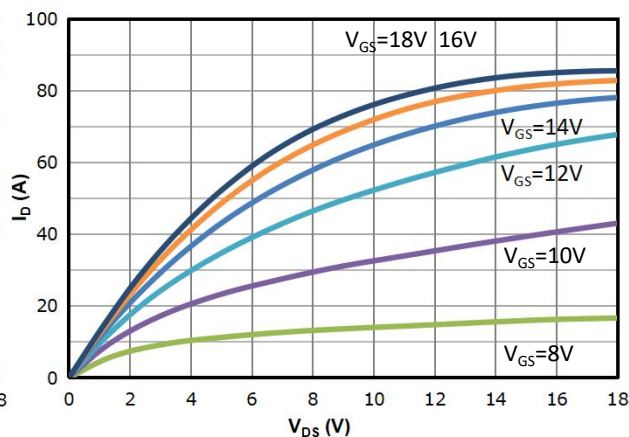


Fig 3: Transfer Characteristics

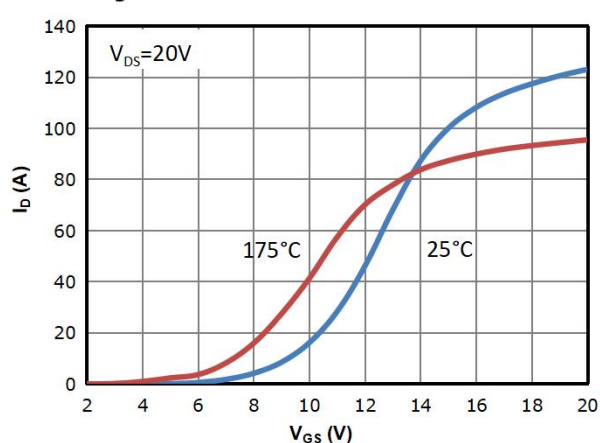


Fig 4: $R_{ds(on)}$ vs Drain Current and Gate Voltage

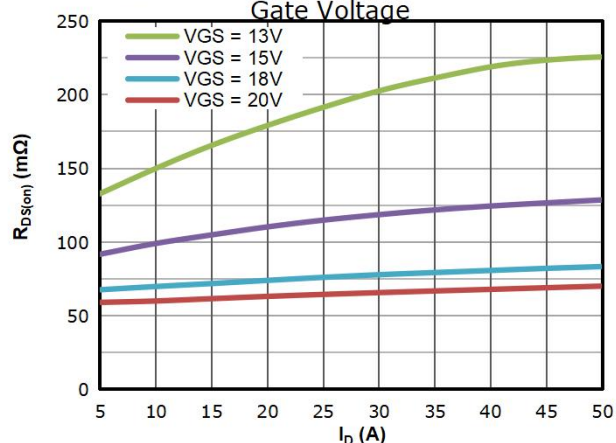


Fig 5: $R_{ds(on)}$ vs. Temperature

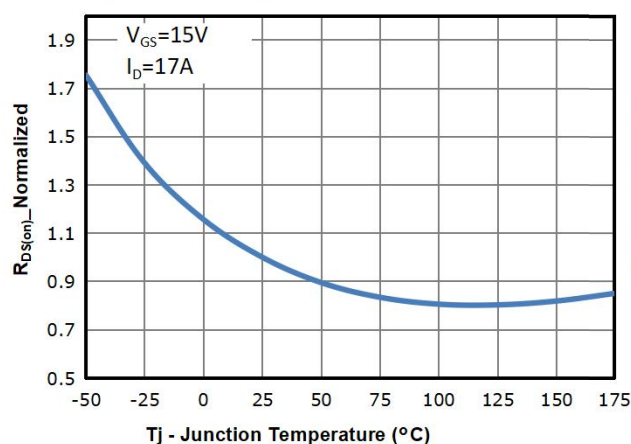


Fig 6: $V_{gs(th)}$ vs. Temperature

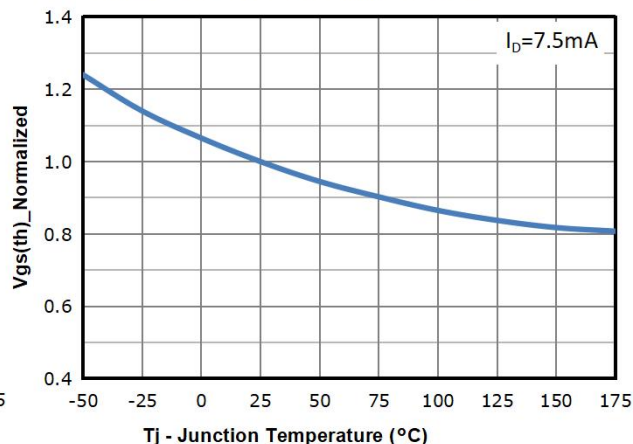


Fig 7: BVdss vs. Temperature

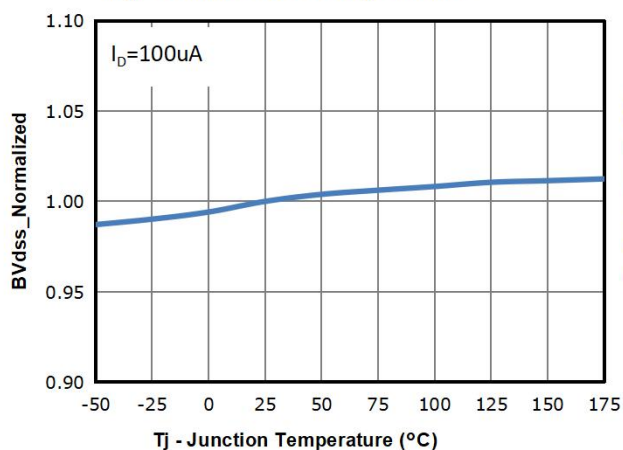


Fig 8: Capacitance Characteristics

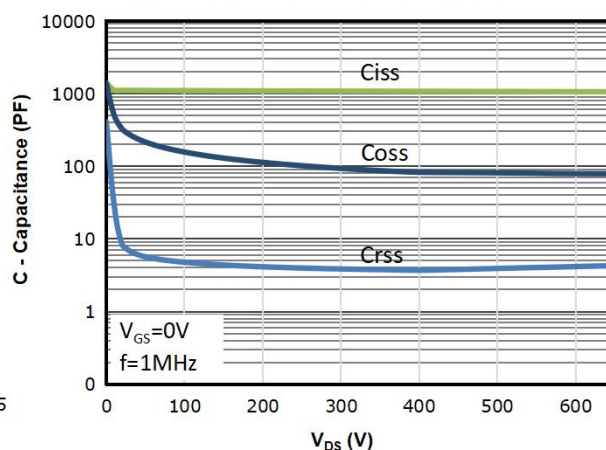


Fig 9: Gate Charge Characteristics

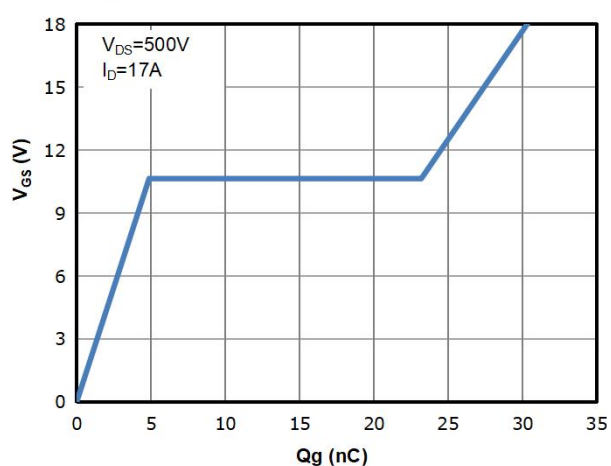


Fig 10: Body-diode Forward Characteristics

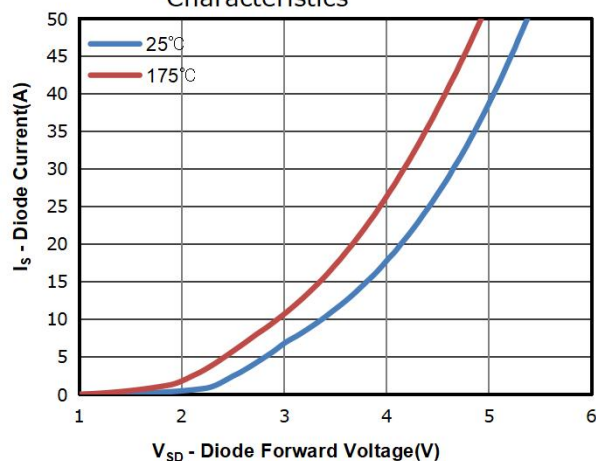


Fig 11: Power Dissipation

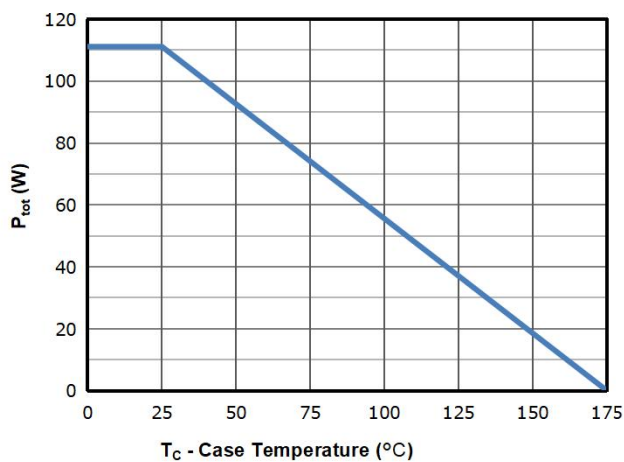
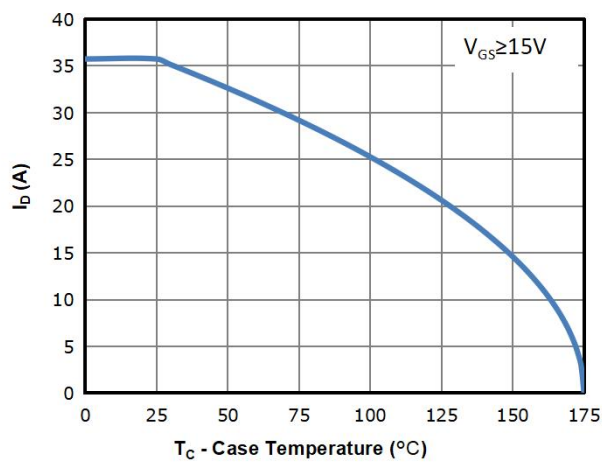


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

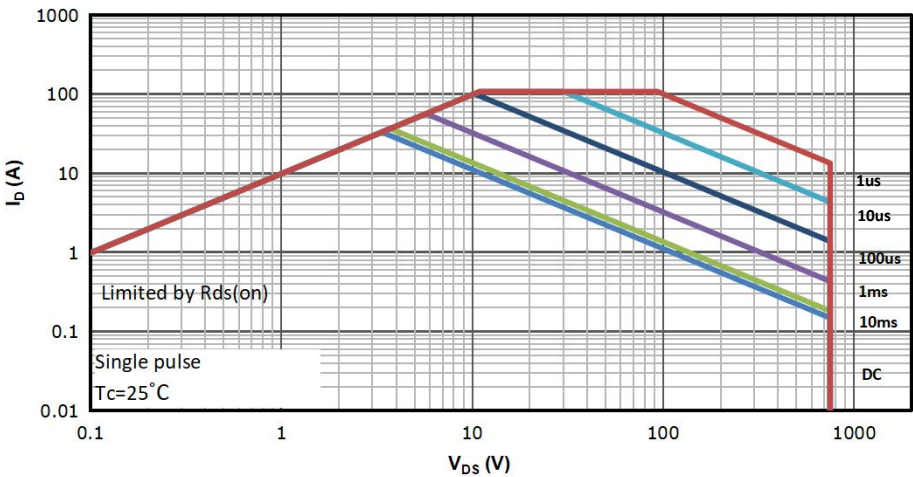
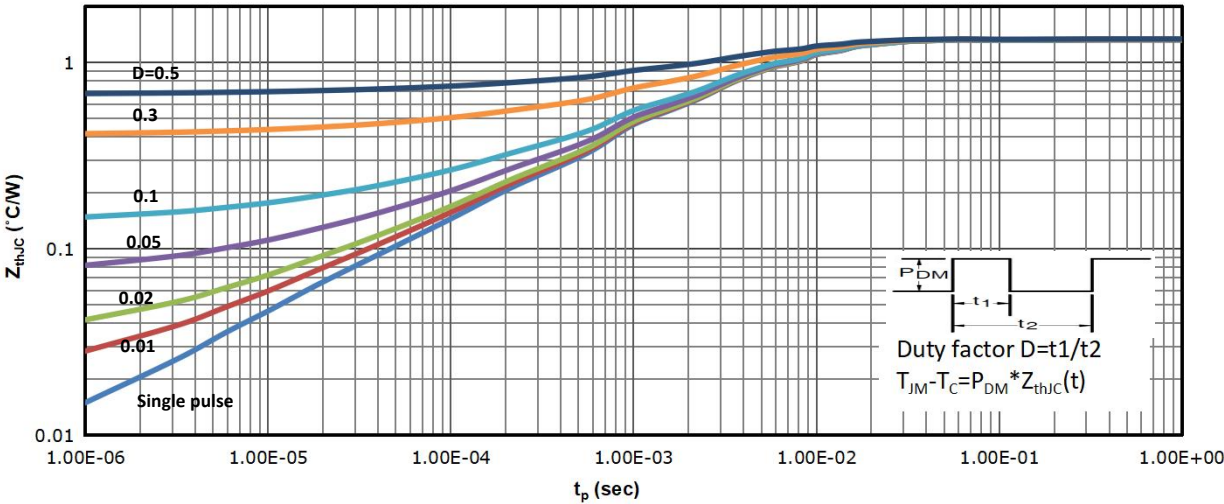
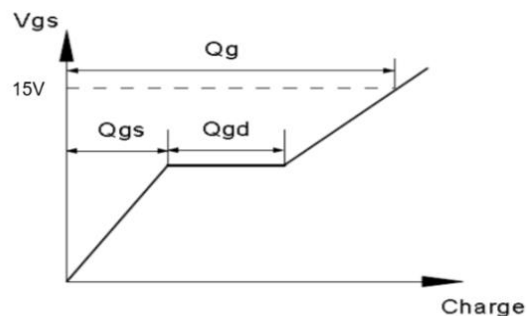
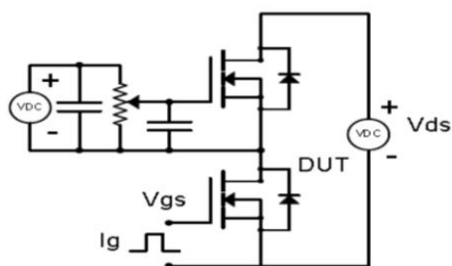


Fig 14: Max. Transient Thermal Impedance

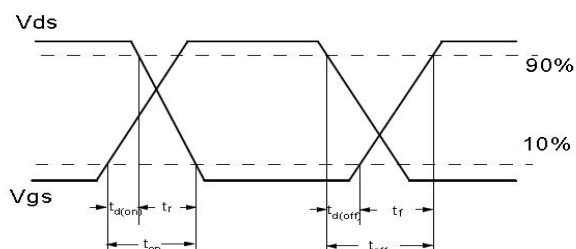
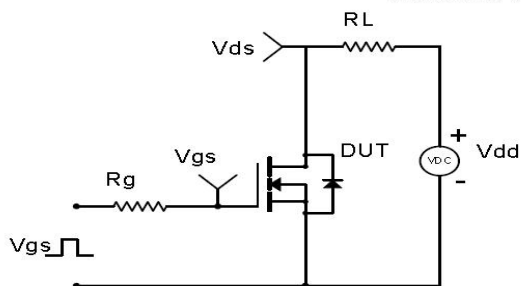


Test Circuit & Waveform

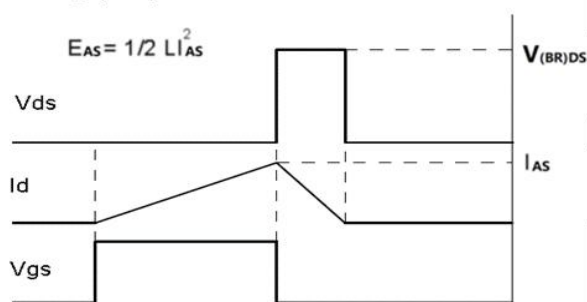
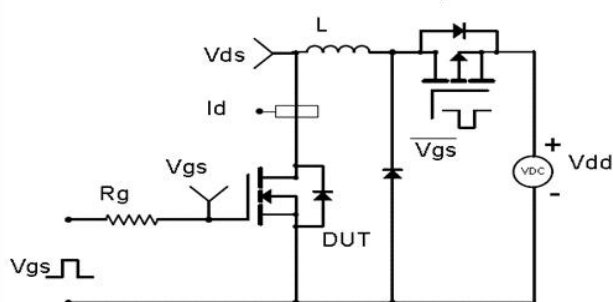
Gate Charge Test Circuit & Waveform



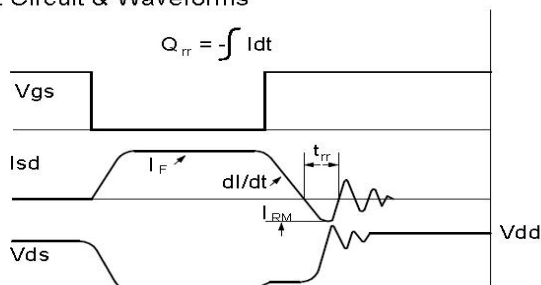
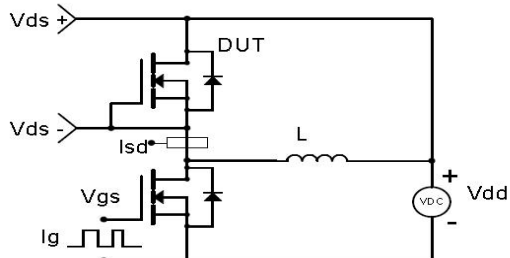
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



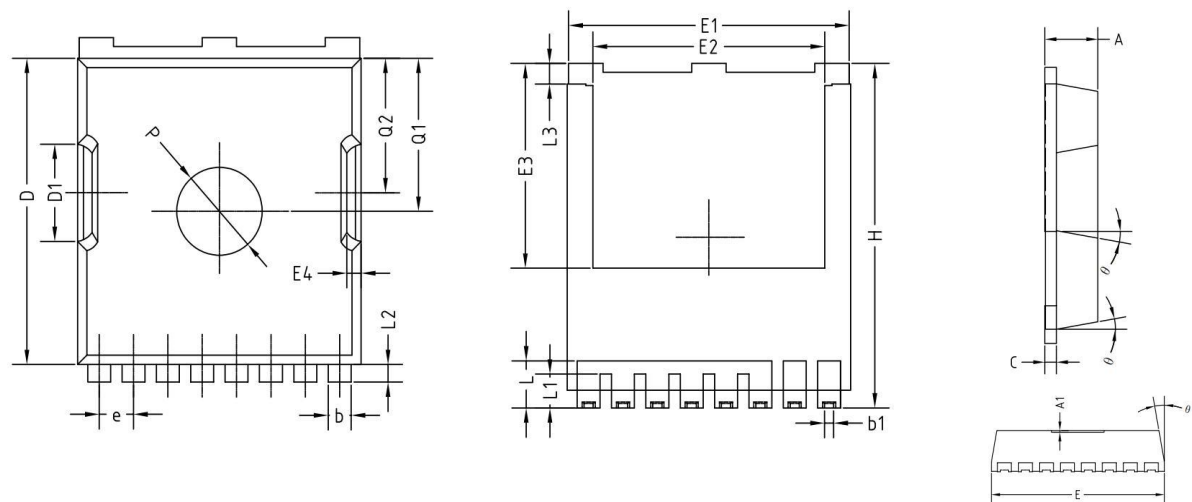
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Package Outline: TOLL-02



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.20	2.40	0.087	0.094
A1	0.05	0.20	0.002	0.008
b	0.65	0.85	0.026	0.033
b1	0.30	0.50	0.012	0.020
C	0.35	0.65	0.014	0.026
D	10.35	10.70	0.407	0.421
D1	3.15	3.45	0.124	0.136
E	9.80	10.00	0.386	0.394
E1	9.65	9.95	0.380	0.392
E2	7.90	8.30	0.311	0.327
E3	6.80	7.20	0.268	0.283
E4	0.30	0.75	0.012	0.030
e	1.15	1.25	0.045	0.049
L	1.35	1.85	0.053	0.073
L1	0.95	1.35	0.037	0.053
L2	0.40	0.80	0.016	0.031
L3	0.60	0.85	0.024	0.033
θ	7°	12°	7°	12°
P	2.90	3.10	0.114	0.122
Q	4.50	4.70	0.177	0.185
Q1	5.10	5.30	0.201	0.209
H	11.55	11.95	0.455	0.470

Disclaimer

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